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BEES COLLECTED BY THE REVEREND O. PIEL IN CHINA

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For a number of years, Father Piel of Shanghai has been interested in the bees of his region. Last year, he visited the United States, and at the U. S. National Museum, with the aid of Miss Sandhouse, determined as many species as was practicable at the time. There remained a considerable residue which could not be determined, and these are recorded below. The Shanghai region is interesting for its combination of Palæarctic and Oriental elements, being, in fact, on the border line between these regions. Specimens of all the species, including the holotypes, are in the American Museum.

Osmia

1.—Small blue or greenish-blue species, anterior wing about 6 mm., ♂ (Zô-Sè, Shanghai, April 20) ..... *microdonta*, new species.
Much larger, metallic colors obscure ..... 2.
2.—Abdomen black, hardly at all metallic, with white hair-bands, ♀ (Zi-ka-wei, April 31) ..... *heudei*, new species.
Abdomen distinctly metallic ..... 3.
3.—Abdomen with red hair-bands, ♀ (Kiang-sou, Zô-Sè, April 16) .. *pieli*, new species.
Abdomen without hair-bands, ♀ ..... 4.
4.—Clypeal projections fully as remote as twice the length of one; hair of pleura and sides of metathorax white (Zô-Sè, April 16) ..... *pedicornis* Cockerell.
Clypeal projections not as remote as twice the length of one; hair of pleura and sides of metathorax fulvous (Zô-Sè, April 16) ..... *rufina*, new species.

Osmia (Chalcosmia) microdonta, new species

Male—Length about 7.5 mm.; moderately robust, densely punctured, dark blue, the abdomen greenish; pubescence white, long and erect on head and thorax, also on first tergite, and forming thin bands on margins of tergites, only those on fourth and following tergites evident when the abdomen is seen from above. Eyes black; face narrow, orbits converging below; clypeus simple; antennæ very slender, black, narrowly pointed at apex, third joint conspicuously longer than fifth; flagellum minutely pubescent, not at all moniliform. Mesothorax and scutellum dullish, very closely punctured; area of metathorax entirely dull in middle, slightly shining at sides; tegulæ very dark, anteriorly metallic. Wings hyaline, stained with brown; second cubital cell ordinary, receiving first recurrent nervure a little more remote from base than second from apex. Legs black, with pale hair, red on inner side of

basitarsi; hind spurs light brown. Abdomen dullish, densely punctured; sixth tergite short, not at all prominent, with a broad shallow notch; seventh narrowly produced apically, strongly bidentate, but the teeth small and very close together, so that the interval between them is narrower than a semicircle; from beneath, the apex of abdomen appears rufescent, and there is a fringe of orange hairs.

Zô-Sè (Piel No. 31).

Very similar to the Chinese *O. subtersa* Cockerell, but distinguished by the longer third antennal joint, the minute whitish pubescence of the flagellum, the duller, greenish abdomen, and the much smaller teeth of seventh tergite. In Friese's key to Palæarctic species it runs to *O. latreillei* Spinola and *O. angustula* Zetterstedt. It is smaller than *O. latreillei*, and the teeth of seventh tergite are very much closer. *O. angustula* is quite differently colored.

Osmia (Chalcosmia) pieli, new species

FEMALE.—Length about 10 mm., anterior wing 8; rather robust, very densely punctured, dark green; the clypeus, front, posterior disc of mesothorax, and wholly dull area of metathorax black; pubescence rich fox-red, including ventral scopa and abdominal bands, on the front and vertex there is much dark fuscous hair. Eyes black; mandibles broad, tridentate; clypeus simple, dull and very minutely punctured all over; antennæ black, third joint slightly longer than next two together, the fourth being very short. Mesothorax and scutellum dull; red hair of thorax long and abundant; tegulæ black, shining in middle. Wings dusky; second cubital cell long, receiving first recurrent nervure about twice as far from base as second from apex. Legs black, with red hair, spurs red. Abdomen somewhat shining, finely and closely punctured, the red hair-bands distinct, especially on fourth and following tergites.

Zô-Sè (Piel No. 32).

In Friese's table of Palæarctic species it runs to *O. panzeri* Morawitz, but it is much larger than *panzeri*, and very different. Benoist has lately described a blue-black species from Japan (*O. orientalis*), allied to *O. panzeri*. There is quite a close superficial resemblance to *O. balearica* Schmiedeknecht, which actually belongs to a different group.

Osmia (Pachyosmia) heudei, new species

FEMALE.—Length about 11 mm., anterior wing 8; robust, head and thorax obscurely greenish, abdomen black, very obscurely submetallic toward the base; head, thorax and abdomen with long erect hair, mostly dull white, and forming distinct white bands on the tergites, but very long and black on front and vertex, some admixture of gray on the thorax above, partly dark on third tergite, and black on fourth and fifth tergites, except the white apical band; ventral scopa orange. Antennæ black, fourth joint fully as long as broad; clypeus prominent, broadly excavated in the form of a V (with the point upward), the excavation black, with a central keel, which is not produced to a spine at the end; at each side, the clypeus presents a large,

but not very long, trigonal process bounding the excavation; mandibles very broad, bidentate, the inner angle not dentiform. Scutellum and disc of mesothorax shining; area of metathorax dull and black in middle, greenish and faintly shining at sides; tegulæ fulvous red. Wings hyaline, with a dark streak in marginal cell; second cubital cell very long, receiving first recurrent nervure about twice as far from base as second from apex. Legs black, with mostly pale brownish or grayish hair, but hind basitarsi with a thick long fringe of black hair behind; the anterior face of the quite broad hind basitarsus has a low median keel. Abdomen hardly shining.

Zi-ka-wei (Piel No. 39).

Named after Pére Heude, the famous naturalist long resident in China. It is very close to the Japanese *O. mitsukurii* Cockerell, but is distinguished by the margins of the tergites not being distinctly fulvous, and abdomen with very distinct hair-bands.

Osmia (Pachyosmia) rufina, new species

FEMALE.—Length about 11.2 mm., anterior wing 8.5; robust, dark olive-green, with abundant erect rather pale red hair, but the very long hair of face and vertex is mostly black, with dull white tufts in region of antennæ; hair of cheeks is very pale; the thorax above has a sparse admixture of dark hairs; the abdomen dorsally has long black hair, but it is fulvous on first tergite; ventral scopa pale fulvous. Eyes black; face broad, clypeus with a broad semicircular polished area, a pair of tubercles on anterior margin, and a pair of large stout (but not very long)processes, pointed at end; mandible strongly produced apically; antennæ black, third joint not as long as next two together; front dull, but a polished area in front of ocelli. Mesothorax and scutellum little shining; tegulæ entirely dark. Wings hyaline, somewhat dusky, with dark streak in marginal cell; second cubital cell receiving first recurrent nervure twice as far from base as second from apex. Legs black, with long mostly pale fulvous hair, but red on anterior and middle tarsi, and long and black posteriorly on hind tarsi, the hind tibiæ also posteriorly with black; hind basitarsi broad. Abdomen moderately shining, without hair-bands.

Zô-Sè (Piel No. 38).

Runs in Friese's table to *O. rufa* Linnæus (which Alfken has recently recorded from Shanghai), but is very easily distinguished by the hair of hind legs.

MEGACHILE

1.—Males.....2.
Females.....4.
2.—Wings deep fuliginous, except at base; large species (Nanking, July 20). *doederleini* Friese.
Wings not fuliginous.....3.
3.—Anterior tarsi simple (Zô-Sè, July 16).....*remota* Smith.
Anterior tarsi dilated white.....*lagopoda pieli*, new subspecies.
4.—Abdomen with continuous light hair-bands; scopa fulvous or whitish, black apically.....5.
Abdomen without such bands.....6.

5.—Large; tegulæ dark ..... *lagopoda pieli*, new subspecies.
Smaller; tegulæ red (Zô–Sè, July 23) ..... *remota* Smith.
6.—Sides of abdomen with spots of pure white hair and fifth tergite with a band; wings extremely dark, except at base (Zô–Sè, Sept. 3) ..... *faceta* Bingham.
Abdomen otherwise; metathorax with fulvous hair ..... 7.
7.—Clypeus transversely keeled; mandibles long; very large species (Haichow, Aug. 5) ..... *doederleini* Friese.[1]
(This differs from Friese's account of *doederleini* by the black spurs, and scopa black except at base, but a Japanese specimen is practically the same.)
Clypeus not transversely keeled ..... 8.
8.—Tegulæ black; abdomen very coarsely sculptured (Zô–Sè, July 25). *dinura* Cockerell.
Tegulæ red ..... 9.
9.—Larger; mandibles produced, with extremely long cutting edge; scopa black except basally (Zô–Sè, July 28) ..... *pseudomonticola* Hedicke.
Smaller; mandibles ordinary; scopa fulvous, black on last two sternites (Zô–Sè, July 29) ..... *humilis* Smith.

Megachile lagopoda pieli, new subspecies

MALE (Type).—Erect hair of first three tergites shorter, and creamy white; hair-bands of tergites 3 to 5 clear white, 4 and 5 with very conspicuous long black hair before the band; keel of sixth tergite less distinctly denticulate (male *lagopoda* compared is from Pest).

FEMALE.—Mandibles more robust, the outer margin more convex; wings dusky; hair of thorax above rich light fulvous, a little stained with brown in middle of disc; ventral scopa creamy white on second sternite, then clear light fulvous, black on last two.

Male, Haichow, July 31 (Piel No. 5). Female, same data, except July 23.

This is a Chinese representative of *M. lagopoda* (Linnæus), but I now see that *M. remotissima* Cockerell, from the Lu Chu Islands, is very closely allied, and not allied to *M. remota* Smith. The present insect differs (♀) from *M. remotissima* by the tegulæ almost black except the somewhat pallid margins (clear ferruginous in *remotissima*), the lower margin of clypeus in middle thickened, distinctly concave, crenulate (straight and shining in *remotissima*) and the abdomen above with four perfectly entire grayish-white hair-bands. The true *M. lagopoda* occurs in Siberia.

Megachile remota Smith

This was described from the female. The male, about 13 mm. long, is parallel-sided, with simple anterior tarsi. Face covered with fulvous hair, cheeks with a long white beard below, black hair behind the ocelli;

[1] In 1910 I suggested that *M. montoni* Gribodo, from Ngan-Hwei, was *M. sculpturalis* Smith. But I now observe that the account of the clypeus indicates rather *M. doederleini*, over which it has priority, should it prove to be identical.

mesothorax and scutellum hardly at all shining (except a polished line along anterior middle margin of scutellum); tarsi with fulvous or red hair on inner side; transverse keel of sixth tergite broadly and obtusely bilobed. It is very similar to *M. subusta* Cockerell, from Formosa, but easily distinguished by the bright ferruginous tegulæ, and the abdomen appearing black, with thin very pale fulvous hair on first tergite, and no red bands, but slender dull white ones in basal depressions of tergites 3 and 4. The surface is black, without the metallic color seen in the female.

Heriades

Heriades sauteri Cockerell

Female, Zô-Sè, Aug. 14. A cotype from Formosa differs by the slightly brownish wings, but appears to be the same species.

Coelioxys

Female about 15 mm. long; wings fuliginous; hair of eyes very short. *ruficincta*, new species.

Female about 12.5 mm. long; wings brownish hyaline; hair of eyes long (Chinkiang, April 13) ..... *rufescens turanica* Friese.

(*C. rufescens turanica* was described from Mongolia.)

Coelioxys ruficincta, new species

Female.—Length about 15 mm., anterior wing 11.5; black, including the mandibles, antennæ, tegulæ and legs; face (including clypeus) densely covered with rufofulvous pubescence; occiput with a fringe of red hair; cheeks with white hair, dense below; thorax above practically bare, appearing very black; a little tuft of red hair behind each tegula; pale reddish hair at sides of metathorax and fringing tubercles, but hair on under side of thorax and on coxæ white; tarsi with fulvous hair on inner side; abdomen with a narrow pale reddish hair-band (broader and brighter at sides) on first tergite; tergites 2 to 4 with very conspicuous bright orange-fulvous hair-bands, the corresponding sternites with very pale bands. Eyes slightly converging below, their hair very short; third antennal joint a little shorter than fourth; vertex very coarsely cancellate-punctate; cheeks below with an area covered with appressed hair. Mesothorax and scutellum extremely coarsely rugose-punctate, scutellum without keel or median projection; axillar spines short and obtuse, a little curved inward; mesopleura very coarsely sculptured. Wings fuliginous, shining violaceous, paler at base; second cubital cell receiving first recurrent nervure about twice as far from base as second from apex. Abdomen dullish, with very strong irregularly scattered punctures, tergites 2 to 4 punctured in the same manner, 5 a little more finely, and sixth (which is wholly dull except for the strong median keel) still more finely; sixth tergite obtusely pointed at end, the apical sternite similar but narrower, and extending a moderate distance beyond, but hardly curved downward and not notched at the sides; sternites 1 to 4 strongly punctured; spurs dark red.

Zô-Sè, July 23, 1924 (Piel No. 18).

A very handsome and distinct species, looking something like a gigantic *C. turneri* Cockerell. I have not seen the Formosan *C. suisharyonis* Strand, which is said to resemble *C. turneri* and is 14 mm. long, but from the description it is quite a different species.

Cœlioxys fenestrata Smith

It seems desirable to add a note on this species. F. Smith described it (1873) in his paper on the Aculeate Hymenoptera of Japan, and gave as localities Hakodadi (i.e., Hakodate, north Japan) and North China. The type must be the Japanese insect, but two Chinese specimens are in the British Museum. Smith does not say whether the eyes are hairy or not, but in Proc. U. S. National Museum, 1919, p. 181, I stated that the eyes were hairless. In Trans. Amer. Ent. Soc., 1905, p. 335, I gave notes on the British Museum material without referring to the eyes. But in Amer. Mus. Novit., No. 274, 1927, forgetting my earlier statement, I said that the eyes were hairy. Mr. Robert B. Benson informs me that the British Museum does not possess the type, but the two Chinese specimens they possess have hairless eyes. Apparently it must be accepted that *C. fenestrata* belongs to the subgenus *Liothyrapis*, but there remains a possibility that the type (from north Japan) is different from the Chinese insect.

MELECTA

Melecta chinensis, new species

MALE.—Length about 12 mm., anterior wing 11.; similar to *M. plurinotata* Brullé (specimens from Cyprus compared), but smaller and less robust, middle tibiæ with white hair more extensive, reaching to base; outer face of hind tibiæ covered with white hair, though thin in the apical portion; outer face of hind basitarsi entirely covered with silvery-white hair; inner white spots on second tergite larger, and closer to the very large quadrate outer spots, so that the interval between them is less than the diameter of an inner spot; third tergite with inner and outer spots also large, subequal, the distance between them much less than the diameter of one; fourth tergite with a very small faint patch of pale hair in place of outer spot, but hardly noticeable; white hair on venter more extensive.

Zi-ka-wei, May 8, 1925 (Piel No. 19).

This could be regarded as a subspecies of *M. plurinotata.* Alfken has lately recorded *M. quatuordecimpunctata* Fischer-Waldheim (originally described from the Urals) from Shanghai, but I cannot see any reason for so referring the present insect.

NOMADA

Nomada koreana Cockerell

Female, Zi-ka-wei, April 12 (Piel No. 40). It differs from the type by having the yellow marks on third tergite large, but it appears to represent no more than a variation. It is closely allied to the European *N. ruficornis* (Linnæus) and *N. flava* Panzer.

ANTHOPHORA

1.—Abdomen covered with bright red (ferruginous) hair.....2.
Abdomen without red hair; females, with tegument of face black.....3.
2.—Female, with tegument of face black.....*ferreola*, new species.
Male, with yellow clypeus.....*ferreola*, new species.
3.—Hair of thorax above fulvous, of front and vertex black..*nigrifrons*, new species.
Hair of thorax above not fulvous.....4.
4.—Larger and more robust; tergites with pure white hair-bands (Chinkiang, April 2).....*melanognatha* Cockerell.
Smaller; tergites with gray hair-bands (Zô-Sè, April 17).
pingshiangensis Strand.

Anthophora nigrifrons, new species

FEMALE.—Length about 14 mm., anterior wing 10; robust, black, including face, mandibles, legs and antennæ, but tegulæ translucent light rufotestaceous. Eyes brown; face broad; malar space small but evident; clypeus prominent, convex, densely punctured but shining with a strong median keel or raised line on upper half; hair of face, cheeks and lower part of sides of thorax grayish white, of front and vertex long and black, of entire upper part of thorax and base of abdomen light fulvous, not mixed with black; third antennal joint about 0.65 mm. long (as in *A. abjuncta* Cockerell). Posterior disc of mesothorax and anterior half of scutellum polished and little punctured. Wings dilute brownish. Legs with black hair; spurs very dark (red in *A. abjuncta*). First tergite with long pale fulvous hair; second with very thin hair, especially at sides; margins of second and third tergites with the bands of long grayish-fulvous or almost whitish hair; dorsum of abdomen otherwise bare, very finely and closely punctured; apex with black hair.

Chinkiang, May 13, 1919 (Piel No. 30).

Very much like *A. abjuncta* Cockerell from Suifu, but with shining, keeled, clypeus, thus approaching *A. agama* Radoszkowski, which however has a small yellow mark on clypeus. In Friese's table of European species it runs to the vicinity of *A. acervorum* var. *pennata* (Lepeletier.)

Anthophora ferreola, new species

MALE (Type).—Length about 12 mm., anterior wing 11.3; black, including mandibles, antennæ, and legs, but tarsi more or less rufescent, though dark; head with long pale hair, slightly yellowish, but much long black hair at sides of front,

and some between antennæ. Malar space short but distinct; maxillary palpi short; eyes chocolate-color; labrum, clypeus, transverse supraclypeal band, and small stripe on each side next to upper part of clypeus, all light orange-yellow, but a broad black band between eye and clypeus; third antennal joint about 0.53 mm. long. Thorax entirely clothed with long light fulvous hair, nearly the same above as below; mesothorax moderately shining; tegulæ hyaline testaceous. Wings brownish hyaline. Hair of legs like that of thorax; middle tarsi unmodified but hind basitarsi broadened and flattened, with red hair on inner side; spurs red. Abdomen thickly covered above with long erect hair, yellowish at base, but on tergites 2 to 4, and at base of 5 very bright fox-red; apex with some black hair.

FEMALE.—Length about 14 mm.; tegument of face entirely black; clypeus with a strong ridge; much long fulvous hair in the region above the clypeus; hind tibiæ and tarsi with dark hair on inner face, contrasting with the clear red of outer.

Male, Zô-Sè, April 17, 1930 (Piel No. 26); female, Chinkiang, April 13, 1918 (Piel Nos. 27 and 1258).

Easily known in the Chinese fauna by the abundant red hair. The male rather closely resembles *A. pulcherrima* Bingham, taken at 15,000–16,000 ft. in the Himalayas. The face-markings are closely similar, but *A. pulcherrima* has a light mark on scape. The hind basitarsus of *A. pulcherrima* also has a lump toward the end on anterior margin. Although these species are distinct, they are undoubtedly allied.

TETRALONIA

Tetralonia floralia Smith

Male, Zi-ka-wei, April 12, 1925 (Piel No. 44).

BOMBUS

With a black band between the wings; hair at apex of abdomen red (Ihing, Prov. Kiangsu, July 17, Piel No. 35) ..... *trifasciatus* Smith.

With no black band between wings; hair of abdomen beyond second tergite black (Nanking, July 15, 1918, Piel No. 41) ..... *nasutus* Smith.

B. nasutus looks much like *B. melanurus* Lepeletier, from Samarkand, but has a much shorter malar space.

NOMIA

1.—First four tergites with broad green bands; female ..... *curvipes* Fabricius.
First tergite with no light band ..... 2.

2.—Male; hind tibiæ with a quadrate pale yellow apical lobe ..... *chalybeata* Smith.
Females; hind tibiæ without such a lobe ..... 3.

3.—Abdomen without blue or green bands ..... *pieli*, new species.
Abdomen with three green bands ..... 4.

4.—Bands blue-green, very brilliant; tergites with metallic colors. *chalybeata* Smith.

Bands pale yellowish-green, suffused with red; tergites not metallic before bands.....5.
5.—Postscutellum dentate.....*punctulata* Dalla Torre.
Postscutellum not dentate.....*viridicinctula*, new species.

Nomia chalybeata Smith

Female, Zô-Sé, June 23 (Piel No. 25); male, same place, July 10 (Piel No. 23). I cannot doubt that these are *N. chalybeata*, which was described from Shanghai but the antennæ are darker and the hair on thorax (largely black on dorsum) is much less fulvous than Smith's description (and more especially Bingham's) would suggest. The female is easily distinguished from *N. pavonura* Cockerell, from the Foochow district, by the narrower abdominal bands.

Nomia punctulata Dalla Torre

Female, Nanking, Sept. 16 (Piel No. 24). The three abdominal bands are light emerald-green, suffused with vermilion. The species was described from China and has been recorded from Japan and Formosa. It is possible that two or three races may be distinguished, when more material is available.

Nomia curvipes Fabricius

Female, Tchenkiang, Sept. 3, 1918 (Piel No. 21). The scape is red only at base, and the femora are black except the knees, but I cannot well separate this from the Indian *N. curvipes*.

Nomia pieli, new species

FEMALE.—Length about 10.5 mm., anterior wing 8; robust, black, the hind margins of tergites 2 to 5 dull white, the bands rather inconspicuous, that on second tergite very narrow; beneath these bands are short fringes of white hair; head and thorax with white hair, not very abundant, mesothorax and scutellum with scattered erect black hair, as well as a certain amount of pale, but the surface not very hairy. Clypeus dull and minutely rugosopunctate, flattened in middle and without any keel; supraclypeal area broadly polished and shining; antennæ black, the flagellum very faintly brownish beneath, and red at tip; a shining line behind ocelli. Mesothorax dull, very densely and minutely rugosopunctate, scutellum more shining, posteriorly with a shining sulcus in middle; postscutellum prominent but unarmed; metathorax very finely rugose, including basal area, but a fine polished linear space between postscutellum and metathorax really consisting of lower edge of postscutellum; mesopleura dull; tegulæ rather large, reddish brown, without pale margin. Wings grayish-hyaline, not yellowish, with no distinct apical cloud; stigma dark reddish brown. Legs with whitish hair, becoming fulvous on inner side of tarsi; hind basitarsi broad; spurs dark red. Abdomen shining, basal part of first two tergites with

thin white pubescence; punctures of first and second tergites extremely fine and close; ridge bounding broad apical depression of first tergite very prominent; venter with much fulvous tomentum on sternites 3 to 5.

Ihing, Prov. Kiangsu, July 12, 1923 (Piel No. 22).

Closely related to the Philippine Island *N. recessa* Cockerell, but easily separated by the shining abdomen, larger and duller scutellum, etc. Compared with *N. rustica* Westwood, from Ceylon, it is larger, and the wings are not flavohyaline.

Nomia viridicinctula, new species

FEMALE.—Length about 12 mm., anterior wing 10; very robust, black, with very narrow even tegumentary bands on margins of tergites 2 to 4 (on 2 and 3 occupying less than half of the depression), these bands pale yellowish-green, the first two strongly suffused with vermilion at sides; flagellum obscurely reddened beneath; hair of head and sides of thorax grayish, but on thorax above, and sides of metathorax, pale fulvous, not at all hiding surface of mesothorax. Clypeus shining, with scattered strong punctures, distinctly swollen on each side, and with a distinct but delicate median keel; supraclypeal area elevated, shining on disc. Mesothorax dull, finely punctured, posteriorly with a crescentic shining area; scutellum large, with irregular punctures of two sizes; postscutellum with long fulvous hair, unarmed; posterior face of metathorax dull, but the basal channel shining, with little cross-ridges; mesopleura shining posteriorly; tegulæ apricot-color. Wings with a very distinct apical cloud; stigma ferruginous, nervures fulvous; second cubital cell receiving recurrent nervure far beyond middle. Legs dark, with pale fulvous hair, but tegument of hind tibiæ and tarsi distinctly brown; spurs dark reddish; hind basitarsi broad, concave on outer side, with a large red apical tuft. Abdomen finely and mostly indistinctly punctured, dullish, but the apical depressions of tergites shining; apex with grayish-black hair; venter with fulvous hair.

Yue Wan Kiai, Ningkwo, Prov. Anhwei, July 26, 1920 (Piel No. 20).

A striking species, looking much like the Formosan *N. megasoma* Cockerell, but the abdominal bands quite different. The clypeal structure is closely similar, and no doubt the two are related.

ANDRENA

All are females.

1.—About 10. mm. long, with no red hair on thorax.....*speculella*, new species.
Much larger, with red hair on thorax.....2.

2.—Abdomen with hair-bands; hair of mesopleura fulvous..*mediocalens*, new species.
Abdomen without hair-bands; hair of mesopleura mainly black.
crassepunctata, new species.

Andrena crassepunctata, new species

FEMALE.—Length about 13.3 mm.; black, with hair of thorax above, tubercles and just below wings, bright ferruginous; hair of head black, a little pallid in region of mouth; of thorax (except as above stated), legs and abdomen black; metathorax

with red hair in middle, but long sooty tufts at sides. Process of labrum broadly truncate; clypeus closely and very coarsely punctured, with a smooth middle line; facial foveæ dark, separated from eye by a punctured band, the lower end far below level of antennæ; third antennal joint about as long as next two combined; flagellum narrowly rufous beneath. Mesothorax finely punctured, densely covered with hair; area of metathorax triangular, well defined, a little shining; tegulæ ferruginous, dusky anteriorly. Wings fuliginous, pallid at base; stigma ferruginous with a heavy dark margin; nervures strong, black or nearly; basal nervure meeting nervulus; second cubital cell broad, receiving recurrent nervure about middle. Legs black, spurs ferruginous. Abdomen shining black, without bands, very minutely and not conspicuously punctured; second tergite in middle depressed not much less than half (about four-ninths); apical fimbria black and heavy; venter with long black hair.

Zô-Sè, Kiang-sou, April 17, 1930 (Piel No. 36).

This looks exactly like *A. thoracica* and several allied species, which may be separated thus:

1.—Clypeus with a smooth median line.....2.
Clypeus very finely and densely punctured, with no trace of a smooth line; abdomen more distinctly punctured than in *A. thoracica*.....3.
2.—Punctures of clypeus very coarse and distinct.....*crassepunctata*, new species.
Punctures of clypeus extremely fine and close.....*thoracica* Fabricius.
3.—Second tergite depressed about or nearly half; abdomen highly polished and weakly punctured.....*sinensis* Cockerell.
Second tergite depressed much less than half.....*assimilis* (Radoszkowski).

Andrena mediocalens, new species

Female.—Length 13 mm.; not very robust, black, including mandibles, antennæ and legs; thorax above with dense bright ferruginous hair, extending onto the tubercles; hair of head thin and grayish on face, slightly reddish at base of antennæ, but abundant and black on front and vertex, pale fulvous on occiput; hair of sides and under parts of thorax pale grayish, a little fulvous; long pale hair below the sharp lateral margins of posterior face of metathorax; anterior legs with pale hair, brownish on inner side of tarsi; fringe beneath middle femora, and behind posterior ones, and large basal floccus on hind legs, creamy white; middle and hind tibiæ and tarsi with black hair; spurs ferruginous; abdomen with very thin erect white hair on first tergite; tergites 2 to 4 with narrow dull white apical hair-bands, not dense; apical fimbria black; ventral fringes gray, Facial quadrangle broader than long; malar space hardly evident; mandibles ordinary, strongly bidentate; process of labrum very broadly truncate; clypeus convex, polished, with scattered distinct punctures, no median ridge; supraclypeal area dull; facial foveæ very broad, very dark chocolate, hardly separated from eye, ending below near level of top of clypeus; third antennal joint longer than next two combined. Mesothorax densely punctured, posterior disc shining, with the punctures well separated; area of metathorax entirely dull and granular, poorly defined; tegulæ clear fulvous; wings dusky, stigma slender, very dark, nervures fuscous; basal nervure slightly basad of nervulus; second cubital cell nearly square, receiving recurrent nervure a little beyond middle. Abdomen shining, the punctures weak on disc of first tergite, but fine and more regular on the

depressed part; second and following tergites with fine close punctures, equally on raised and depressed portions; second tergite depressed little more than two-fifths; apical plate broad and rounded.

Zô-Sè, April 18, 1930 (Piel No. 6).

In the Chinese fauna, this may be compared with *A. mimetes* Cockerell, which is much smaller and has red hair on face. By the black tibial scopa it resembles *A. nigriceps* Kirby, but that is otherwise very different.

Andrena speculella, new species

FEMALE.—Length about 9 mm., anterior wing 7.2; black, not very robust; flagellum very obscurely brown beneath; mandibles obscurely rufescent subapically and with a red basal tubercle; legs not pure black, but more or less brown; hair of head and thorax long, grayish white, very faintly yellowish dorsally, not hiding surface of mesothorax. Facial quadrangle much broader than long; mandibles ordinary; malar space linear; clypeus convex, the disc highly polished, with widely scattered small punctures, a large space in middle impunctate; supraclypeal area dullish; facial foveæ broad, clear reddish-chocolate, hardly separated from eye, ending below at about level of antennæ; process of labrum broad but pointed; cheeks rounded, highly polished. Disc of mesothorax and scutellum shining, with very fine punctures; area of metathorax large, merely granular, dull in middle, a little shining at sides; mesopleura dull; tegulæ clear rufous. Wings reddish hyaline; stigma large, dull ferruginous, with darker margin; basal nervure meeting intercubitus, a little on the outer side; second cubital cell receiving recurrent nervure far beyond middle. Femora with long white hair; hair of tibiæ and tarsi mainly pale brown, but the ample tibial scopa of hind legs white on inner side, and dark brown on outer (posterior); small joints of tarsi pale reddish; spurs very pale. Abdomen with a dull, excessively minutely punctured surface; apical fimbria grayish brown. The third antennal joint is about 240 microns long, somewhat less than the next two joints combined. Under the microscope the abdomen appears to have a very minutely cancellate surface.

Zi-ka-wei, April 11, 1925 (Piel No. 10).

By reason of the red tubercle at base of mandibles, it suggests *A. insolita* L. Dufour, but in other respects it is very different. I do not know any similar Asiatic species.

SPHECODES

Female, with first three tergites red; first tergite impunctate; mesothorax shining but well punctured; clypeus with a median groove; wings brown, but not very dark; five hooks on hind wing; eyes with widely scattered excessively minute hairs..... *grahami* Cockerell.

Male, entirely black, with clear hyaline wings..... *pieli*, new species.

Sphecodes grahami Cockerell

Female, Zô-Sè, on *Ilex*, April 24, 1920 (Piel No. 43). *S. grahami* was described from a female from Suifu, Szechwan. I now have no

material of that species, but from the description I cannot separate the specimen collected by Piel. Apparently it is *S. grahami*, but it is not impossible that there are differences not yet ascertained. It has no place in Blüthgen's table of Oriental species. *S. galeritus* Blüthgen, from Canton, agrees in having five hooks on hind wing.

Sphecodes pieli, new species

MALE.—Length 7 to 8 mm.; entirely black, except as follows: the broad and simple mandibles chestnut-red except at extreme base; tegulæ shining very dark brown, anteriorly with a broad hyaline margin; knees with a small red spot; anterior tibiæ chestnut-red, strongly blackened on outer face; middle tibiæ narrowly red at apex; tarsi dusky red, the hind basitarsi strongly suffused with blackish; spurs red; abdomen shining black, the concealed bases of tergites clear ferruginous, this only seen when they are abnormally extended; venter with dusky reddish bands. Facial quadrangle much longer than broad, the face and front covered with grayish-white hair; antennæ very strongly moniliform, but short for a male, the flagellar joints much shorter than in *S. gibbus;* flagellar joints microscopically cancellate, on one side with a broad basal band of excessively minute appressed silver hair; fourth antennal joint longer than second and third combined; eyes with scattered excessively minute hairs; front dull. Mesothorax and scutellum shining but strongly punctured; base of metathorax large, with extremely coarse irregular reticulation. Wings clear hyaline, stigma and nervures reddish; basal nervure falling short of nervulus; second cubital cell not excessively narrow; five to six hooks on hind wing. Hair of head and thorax dull white. Abdomen highly polished, little punctured, first tergite impunctate, second and third distinctly punctured on basal portion; apex with white hair; apical plate very broad and rounded, red. In Robertson's classification this would go in the genus *Proteraner* Robertson, hitherto only recorded from North America.

Zô-Sè, June 16, 1930 (Piel No. 34).

It is marked "ombelli," which I take to mean that it was found visiting an umbelliferous plant. A second specimen, from the same place, is dated June 27, 1930 (Piel No. 33). This finds no place in Blüthgen's table of Oriental species, and I cannot identify it with any described Palæarctic form. It appears, however, to be near to *S. volatilis* Smith described from Transbaikal, Siberia.

HALICTUS

All are females.

1.—Length about 10 mm.; black, with a large thick head . . *percrassiceps*, new species.
Much smaller . . . . . 2.
2.—Green . . . . . *viridellus*, new species.
Black . . . . . 3.
3.—Mesothorax dull; ocelli large and close together; area of metathorax large; abdomen very broad . . . . . *macrurus*, new species.

Mesothorax shining.....4.
4.—Larger, anterior wing 5.5 mm.; stigma testaceous....*speculicaudus*, new species.
Smaller, anterior wing 4 mm.; stigma dark brown.....*simplicior*, new species.

Halictus percrassiceps, new species

FEMALE.—Length about 10 mm., anterior wing 7.7, width of head 3.5 mm.; black, including mandibles, antennæ (flagellum very faintly reddish beneath) and legs, but tegulæ shining dark rufous, with a broad hyaline anterior margin. Head very large and broad, with broad, convex, shining cheeks; mandibles rather slender; malar space obsolete; clypeus short and broad, the lower margin slightly undulate, and beneath the margin a stiff fringe of yellowish hair; lower part of clypeus shining, depressed in middle, with close strong punctures, upper part with excessively dense minute punctures; supraclypeal area with a prominent median ridge; sides of face glistening, densely minutely punctured; front (between antennæ and ocelli) short; scape long, flagellum short; vertex shining, very finely punctured; hair of head and thorax short, grayish-white. Mesothorax and scutellum shining, with numerous very fine punctures; scutellum with a median sulcus; area of metathorax very short, closely and delicately fluted, broadened and pointed posteriorly in middle; posterior face of metathorax hairy, not sharply defined; mesopleura finely, vertically striate in middle, posteriorly shining. Wings grayish hyaline; stigma dilute sepia; basal nervure very strongly arched, falling a little short of the very oblique nervulus; second cubital cell narrow, greatly narrowed above, receiving recurrent nervure at its apical corner; third cubital cell obliquely subquadrate, broad above. Legs with white hair, pale yellow on inner side of tarsi, brush at end of hind basitarsi bright ferruginous; hind spur pectinate with three large, not very long, blunt spines. Abdomen broad, shining and extremely minutely closely punctured; hind margins of tergites with bands of very short hair, having a grayish effect, entire on fourth tergite, more or less obsolete in middle on second and third, and on first reduced to rudiments at sides; third tergite with a basal band on each side, poorly defined, but on second this is almost obsolete; apical fimbria pale grayish; venter with much white hair, collecting creamy-white pollen.

Zô-Sè, July 5, 1930 (Piel No. 11).

This is a very unique species, by reason of its large head, short clypeus and front, and the peculiar appearance of the abdomen. I have nothing closely allied.

Halictus (Chloralictus) viridellus, new species

FEMALE.—Length about 4.5 mm.; shining yellowish green, with thin dull white hair, slightly yellowish on head and thorax above. Head broad-oval, the face not elongated; mandibles black, very obscurely reddish apically; antennæ black; lower margin of the short clypeus broadly black but rest of face and front strongly glistening, with close punctures, the front as densely punctured as possible, not at all striate. Mesothorax strongly and closely punctured, but highly polished between the punctures; scutellum large, with the punctures smaller than those of mesothorax; area of metathorax pointed behind, but not very sharply defined, with about 20 irregularly placed sharp ridges, some of them rudimentary, and some quite widely separated;

mesopleura conspicuously hairy; tegulæ rather light brown, not punctured. Wings hyaline, slightly grayish, stigma and nervures testaceous; outer nervures slender as in *Chloralictus* (sharply contrasting, as seen under microscope, with the stout outer nervures of the superficially similar *H.* (*Seladonia*) *kessleri* Bramson). Legs black, with pale hair, but knees rufous. Abdomen broad, shining, finely punctured, hind margins of tergites suffusedly testaceous; second and third tergites with obscure patches of grayish hair at basal corners; third and fourth tergites thinly but conspicuously hairy all over the surface, the hair yellowish and quite long; first tergite with punctures very sparse in middle of disc.

Zô-Sè, June 11, 1930 (Piel Nos. 16 and 1392).

An inconspicuous but distinct little species, with the broad abdomen green like the head and thorax. Compared with *H. aureolus* Pérez, the head is more oval, and the stigma is much smaller and less brightly colored.

Halictus macrurus, new species

FEMALE.—Length about 6.3 mm., anterior wing 5.5, width of abdomen 2.4; black, including mandibles, antennæ and legs, but tegulæ posteriorly with a large bright chestnut-red spot; hair of head and thorax scanty, grayish white. Facial quadrangle longer than broad; clypeus moderately produced, the lower part shining, with strong well-separated punctures, the upper part more closely and finely punctured; supraclypeal area well punctured, its upper part with a median keel, which extends half-way up front; front closely and finely punctured, the punctures more or less in rows; ocelli large, the intervals between adjacent ones less than the diameter of one. Mesothorax minutely punctured, the punctures distinctly separated, but on a minutely tessellated surface, so that the mesothorax appears dull, not polished, though more or less glistening in some lights; scutellum finely punctured; area of metathorax large, broadly truncate posteriorly, with numerous more or less vermiform rugæ, the intervals between them shining, and also, near the apical margin, microscopical transverse lineolation; posterior face of metathorax sharp-edged only half-way up sides. Wings brownish hyaline, rather strongly dusky; stigma large, dark rufous; nervures pale, outer intercubitus colored brown like the others, but distinctly more slender; second cubital cell broad below, receiving recurrent nervure at apical corner; third cubital cell not produced apically. Legs with grayish-white hair; hind spur with three strong spines, and a fourth minute. Abdomen dullish, very broad, the margins of the tergites not discolored; there are no hair-bands, or basal patches, but the hind margins of second and third tergites are thinly but evidently hairy at sides; apex with a fringe of pale hair, a little stained with fulvous; venter with white hair.

Zô-Sè, Shanghai, June 12, 1930 (Piel No. 14).

It is allied to the Siberian *H. trichorhinus* Cockerell, but more robust, with a much broader abdomen. There is a general resemblance to *H. opacus* Pérez, but that differs by the much broader face, reddened wings, and distinct sulcus in middle of mesothorax.

Halictus speculicaudus, new species

FEMALE.—Length about 6.7 mm., anterior wing 5.4, width of abdomen about 2.5; black, including mandibles, antennæ and legs; hair of head and thorax thin, grayish, with a slight fulvous tint; tegulæ small, shining black, faintly reddish posteriorly. Facia quadrangle longer than broad, but head not narrow, clypeus not produced, polished, with scattered punctures; supraclypeal area shining; front very finely closely punctured. Mesothorax and scutellum shining, with distinct punctures, sparse on disc of scutellum; the surface between punctures on middle of mesothorax is polished; area of metathorax rather large, glistening, with strong vermiform rugæ which reach the hind margin; posterior face of metathorax with sharp lateral margins up to top. Wings grayish hyaline, not dark; stigma large, dull fulvous; nervures brown, outer nervures distinctly weakened; second cubital cell receiving recurrent nervure some distance from end. Legs with pale fulvous-tinted hair; spurs pale, hind spur with four short but strong spines, and a rudiment of a fifth. Abdomen very broad, highly polished, punctures weak, and hardly visible under a lens; margins of tergites not discolored; no hair-bands, but a transversely elongate patch of white hair at each side of base of second tergite; apex with pale hair.

Zô-Sè, Shanghai, June 12, 1930 (Piel No. 13).

By reason of the rugæ of metathoracic area extending to the margin, and some other characters, it falls near *H. laticeps* Schenck, but the abdomen is quite different, and the thorax is conspicuously more robust than in *H. laticeps.*

Halictus simplicior, new species

FEMALE.—Length about or slightly over 5 mm., anterior wing, 4.3; black, including mandibles, antennæ and legs, but tegulæ rufous, shining; hair of head and thorax thin, grayish white, not at all fulvous. Head seen from in front circular; clypeus highly polished, with irregular punctures; front closely and minutely punctured, dullish; labrum large and prominent, with a distinct tubercle, yet not sufficiently rough to appear dull under a lens. Area of metathorax hardly defined, with no distinct posterior margin, the basal two-thirds with very delicate radiating plicæ, about 18 or 20 in number, the surface beyond the plicæ minutely granular; posterior face of metathorax dull, the sides sharply margined only below. Wings grayish hyaline, not dark; stigma moderate, grayish brown; first intercubitus strong, but the other two very slender; first recurrent nervure meeting second intercubitus. Legs with grayish-white hair, hind spur with few strong spines. Abdomen oval, highly polished, extremely minutely and weakly punctured, the hind portions of first two tergites impunctate, with microscopical transverse lines; second and following tergites with hind margin narrowly and inconspicuously pallid; apex with light hair, slightly fulvous; thin apical hair bands at sides of second and third tergites.

Zô-Sè, Shanghai (Piel Nos. 15 and 1395).

Related to the Siberian *H. perplexans* Cockerell, but mesothorax more shining, and tegulæ much redder. It also resembles *H. minutulus* Schenck, but that has the posterior face of metathorax shining.